

# Felix Oswald's Turkish Algae

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## Synopsis

Algae from the Cretaceous and Caenozoic of Turkey, collected by Felix Oswald in 1898, are re-examined in the light of over eighty years of subsequent algal studies.

## Introduction

The collections of the British Museum (Natural History) are incredibly rich, not merely in the major treasures of the national collection, but in original historical specimens, unique in their day, which were the foundations of so much that followed.

Algae are not usually attractive fossils when collected. Although studied by numerous nineteenth- and early twentieth-century microscopists, the organized development of algal studies generally as an important branch of micropalaeontology did not take place until after the second world war. It was largely initiated as part of the oil industry's researches at that time, to supplement their extensive pioneer use of Foraminifera. At the BM (NH), a separate subsection of fossil algae was not individualized from the fossil plants until 1969, when I was entrusted with this task.

Because of the extensive connections of the oil industry with the Middle East, the national collection of fossil algae contains much material from this area, mostly from sampling carried out between 1930 and 1960. It is therefore of interest to note the presence in the collections of a few Middle East samples collected in 1898, and recognized as algal at the very beginning of the present century.

Felix Oswald (1866–1958; obituaries by Swinnerton 1958, 1959) accompanied W. N. B. Lynch on his second tour of eastern Turkey (then known as Turkish Armenia) in 1898. Oswald's detailed geological observations in this then little-visited area were submitted as an academic thesis in 1905 and fully published with illustrations in 1906, in a book which he type-set and produced himself (Oswald 1906; preface). He acknowledges the help of R. Bullen Newton, then on the staff of the BM(NH), in connection with his palaeontology.

There are four relevant samples in the Museum's collections. They are of Lower Cretaceous, Palaeocene–Lower Eocene and Miocene (two) geological age; all but the second were figured by Oswald. Their re-study, and discussion, is set out below.

## Discussion

### 1. Lower Cretaceous

Oswald (1906): '*Munieria*'; plate facing p. 234 and pp. 236, 340. Buff-grey limestone from Akhveran, 42 km ESE of Bayburt (40° 15' N, 40° 16' E; eastern Turkey). Turkish Geological Map 1 : 800,000, Sheet 4, Erzerum (1943).

The large dasyclad in Oswald's original thin section was identified (probably by Bullen Newton) as a *Munieria* (Deecke 1883); the comparison given is with *Hovelacque* (1900 : pl. 46, fig. 2). This latter, however, does not show a *Munieria* but *Salpingoporella* sp.

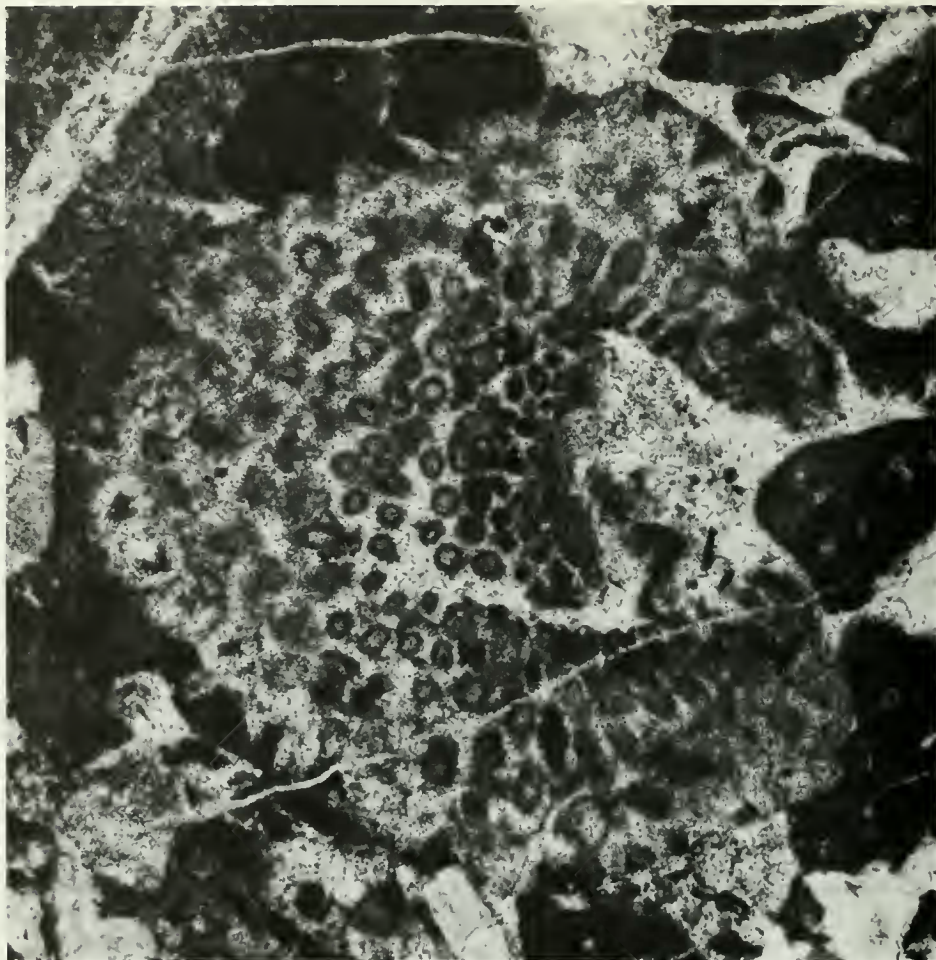


Fig. 1 *Euspondyloporella* sp. Oswald's original section,  $\times 40$ . BM(NH) Palaeont. Dept., reg. no. V11063a.

(Conrad 1970 : 70, and personal communication). Oswald's actual section (refigured here, Fig. 1) shows a *Triploporella* or related genus; the section is oblique and of an individual showing pressure-displacement of the structure, so it is not precisely diagnostic. However, in one of further thin sections now prepared from the small original sample, another dasyclad section (uncrushed) was revealed, showing branches of a different form (Fig. 2). It seems unlikely that these two sections are of different taxa and they may well be of the same individual. It is stated of *Euspondyloporella duplicata* Sokač & Nikler (1973 : 23) that 'the primary [branches] are represented by two forms. In the club-shaped [top] portion of the alga, they are thin and tubular, slightly thickened in the distal part. Below the top, the primary branches consist of a handle occupying  $\frac{1}{3}$  of the length, and of an elongated egg-shaped thickening occupying  $\frac{2}{3}$  of the total length of the branch'. In the Oswald material, the original section shows the second pattern, and the new section the first. Further evidence for this determination lies in the large number of primary and small number of secondary branches, the spore-packed branches seen (when not replaced by infill calcite) and

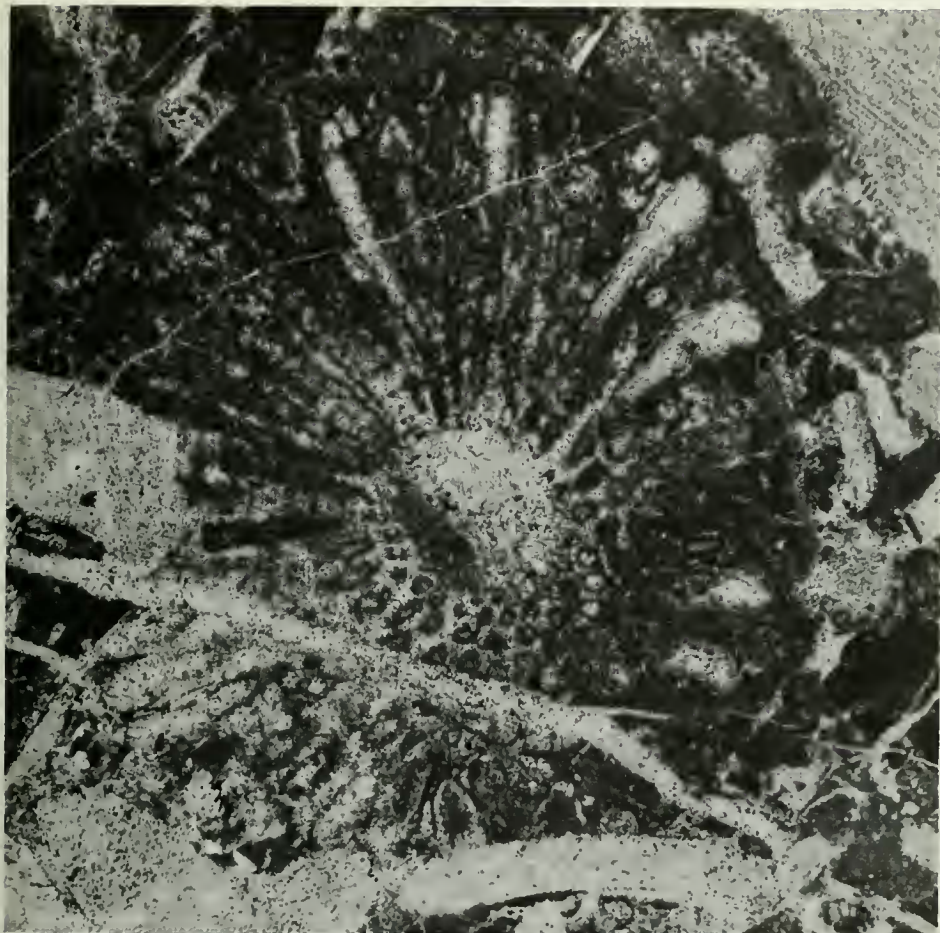


Fig. 2 *Euspondylopora* sp.; a second section showing club-shaped branches from the apex of the thallus,  $\times 30$ . Reg. no. V11063b.

gross dimensions, all shown both by Sokač & Nikler's Yugoslav type material and Oswald's Turkish material.

It would seem, therefore, that Oswald's dasyclad can certainly be identified as an *Euspondylopora* (Triploporellae), and probably as *E. duplicata*, though suitable additional sections would be necessary to confirm this.

The other accompanying organisms are a typical Tethyan Lower Cretaceous assemblage for this facies, which is widespread through the circum-Mediterranean and Middle East. They comprise the microproblematicum *Carpathoporella fontis* (Patrulus) (see Jaffrezo 1974 for the involved synonymy), the algae *Cayeuxia* sp. and *Solenopora* sp. and the problematic *Lithocodium aggregatum* Elliott. Bivalve and echinoid fragments occur. Oswald (1906: 339, 340) stated that the algal limestone was succeeded by radiolarian limestone. South of the Turkish frontier, in the Lower Cretaceous of Iraqi Kurdistan, the organic Qamchuqa Formation (with algae) intertongues with the basinal radiolarian

Balambo Formation (Dunnington, Wetzel & Morton 1959 : 50, 230), and Oswald's Turkish account seems compatible.

The exact level of the type-material of *Euspondylaporella* in the Lower Cretaceous was given as probably Barremian–Aptian (Sokač & Nikler 1973 : 8). The Oswald sample, to which he assigned Hauterivian age, does not show orbitolines etc., and if therefore from a pre-orbitoline horizon, a Hauterivian–Barremian age seems likely.

## 2. Palaeocene–Lower Eocene

Oswald (1906) : '*Lithothamnion*'; pp. 249, 418. Dark-grey limestone from Chörak Khan, 45 km NW of Bayburt. Turkish Geological Map 1 : 800,000, Sheet 3, Sivas (1946).

'*Lithothamnion*' was for a long time used as a general term for a very wide variety of coralline algae, Recent and fossil. The examples in Oswald's rock are cylindrical units of the segmented coralline *Amphiroa*; probably a new species, but the rock and its fossil content are markedly affected by mineralization and diagenesis – Oswald refers to the rock as a marble (Oswald 1906 : 248, 418) – and most examples of the fossil are obscured by this. Associated are fragments of *Archaeolithothamnium* sp., ? *Pycnoporidium*, ? *Elianella* (*Parachaeetetes* auctt.), and what from outline and traces of structure remaining is probably the feather-alga, *Distichoplax biserialis* (Dietrich) Pia. Molluscan and echinoid debris is also present.

This is probably a Palaeocene–Lower Eocene assemblage; a better-preserved sample could confirm this. All of these genera and species occur in rocks of that age in northeastern Iraq, south of the Turkish frontier, and so Oswald's assigned age of Middle–Upper Eocene can be modified. His '*Lithothamnion*' is an *Amphiroa* sp. (Fig. 3) showing wide peripheral perithallus bordering the distinctive zones of the medullary hypothallus, and it is not the same as the Iraqi Palaeocene *Amphiroa elliotti* (Johnson 1964). The Turkish species is not formally described as new by reason of the preservation.

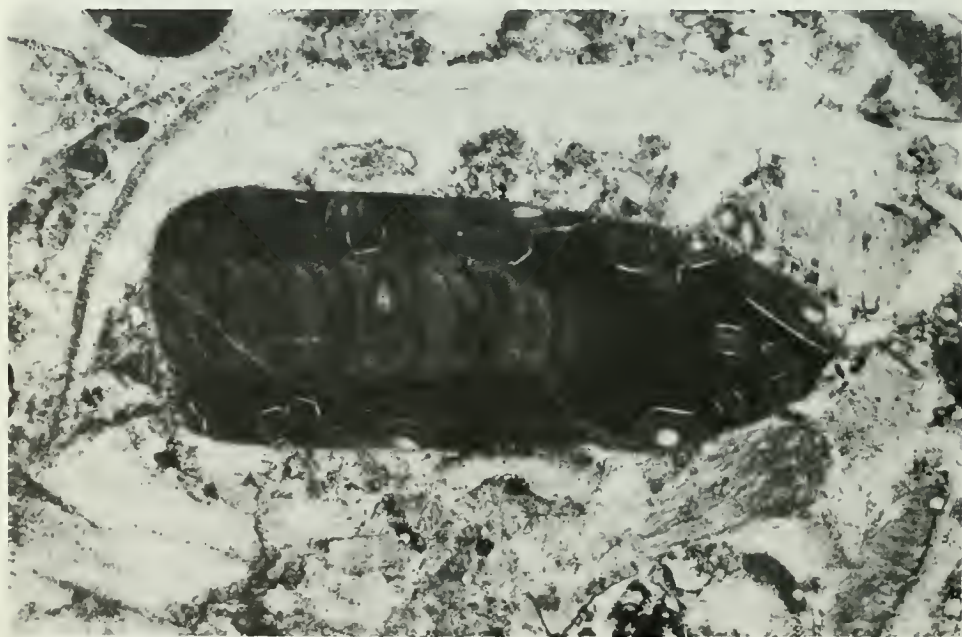


Fig. 3 *Amphiroa* sp.; original section of Oswald,  $\times 50$ . Reg. no. V11064a.

### 3. Miocene

Oswald (1906): '*Lithothamnion ramossissimum* Reuss'; p. 52 and facing pl., fig. 9; p. 452. Light-brown limestone from Madrak, 19 km SSE of Erzerum. Also p. 81 and facing pl., fig. 1; p. 453. Creamy-pink limestone from Kanjean, 48 km north of Malazgirt. Malazgirt (39° 09' N, 42° 30' E) is 138 km SE of Erzerum. Turkish Geological Map 1 : 800,000, Sheet 4, Erzerum (1943).

Specimens from these two samples are preserved in the collections of fossil bryozoa at the BM(NH), reg. nos D 7958–7967 incl. The thin sections shows a rich algal–bryozoan assemblage similar to that of the European Vienna-Basin Miocene (Leithakalk), the algal microflora of which was revised in detail by Conti (1946). Oswald's figured Madrak specimen appears to be *Lithophyllum piai* Conti and his Kanjean specimen *Palaeothamnium archaeotypum* Conti.

### Conclusions

It is noticeable how, in spite of the relatively rudimentary knowledge of fossil algae available at the beginning of this century, Oswald assigned his material to approximately the right geological ages. He did not, of course, depend solely upon the algae; stratigraphy and other fossils were available. What is remarkable is his thoroughness in doing all that could be done to determine the algae, then regarded as of very little value. Modern sampling of these localities would yield more and perhaps better-preserved materials, but his pioneer effort is noteworthy.

### References

- Conrad, M. A. 1970. Barremian and Lower Aptian Dasycladaceae in the area surrounding Geneva (Switzerland). *Geologica romana*, 9 : 63–100.
- Conti, S. 1946. I. Revisione criteria di *Lithothamnium ramossissimum* Reuss. 2. Le Corallinacee del calcare miocenico (Leithakalk) del bacino di Vienna. *Pubbl. Ist. Geol. Univ. Genova*, ser. A (Paleont.) 1–2 : 1–68.
- Deeke, W. 1883. Ueber einige neue Siphoneen. *Neues Jb. Miner. Geol. Paläont. Jahrg.*, Stuttgart, 1883 1 : 1–14.
- Dunnington, H. V., Wetzel, R. & Morton, D. M. 1959. Mesozoic and Palaeozoic. In Iraq. *Lexique Strat. Int.*, Paris, **Asie 10a**. 333 pp.
- Hovelacque, M. 1900. *Album de microphotographies de roches sédimentaires*. 14 pp., 69 pls and expl. Paris.
- Jaffrezo, M. 1974. Les algues calcaires du Jurassique supérieur et du Crétacé des Corbières (2me Partie). *Rev. Micropaléont.*, Paris, 17 : 23–32.
- Johnson, J. H. 1964. Paleocene calcareous red algae from northern Iraq. *Micropaleontology*, New York, 10 : 207–216.
- Oswald, F. 1906. *A Treatise on the Geology of Armenia*. 516 pp., 35 pls. Beeston, Notts., England. Privately published. (Printed text of thesis, not illustrated, same title, issued 1905, 425 pp. London).
- Sokač, B. & Nikler, L. 1973. Calcareous algae from the Lower Cretaceous of the environs of Nikšić, Crna Gora (Montenegro). *Palaeont. jugosl.*, Zagreb, 13. 57 pp., 16 pls.
- Swinnerton, H. H. 1958. (Obituary of F. Oswald). *Nature, Lond.* 182 (4649) : 1549.
- 1959. (Obituary of F. Oswald). *Proc. geol. Soc.*, London, 1572 : 151–152.